

## **TRANSPORT IN COMPOSITE MEDIA:** *Interface reaction rates*

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Modulated permeation experiments have been shown to provide valuable insight into permeation processes. In particular, surface and bulk effects can be separately identified from the experimental data. A basic model has been developed to account for permeation through a binary membrane comprising a coating and a substrate. The model separates molecular or atomic transport through the coating. The interface reaction kinetics are taken into account in terms of rate constants. It is shown that given adequate knowledge of the substrate the permeation parameters of the coating can be deduced. This greatly extends the range of materials which can be examined, particularly those materials which can not be obtained as foils such as ceramics. Some strategies for first wall reactor materials combine a low diffusivity ceramics on a mechanical substrate; such binary, even more complex structures can now be assessed through the modulated permeation method. Measurements on titanium carbide coated TZM analysed by the model and permeation parameters including interface reaction rates are obtained in the temperature range 570-800 K.